INCH-POUND

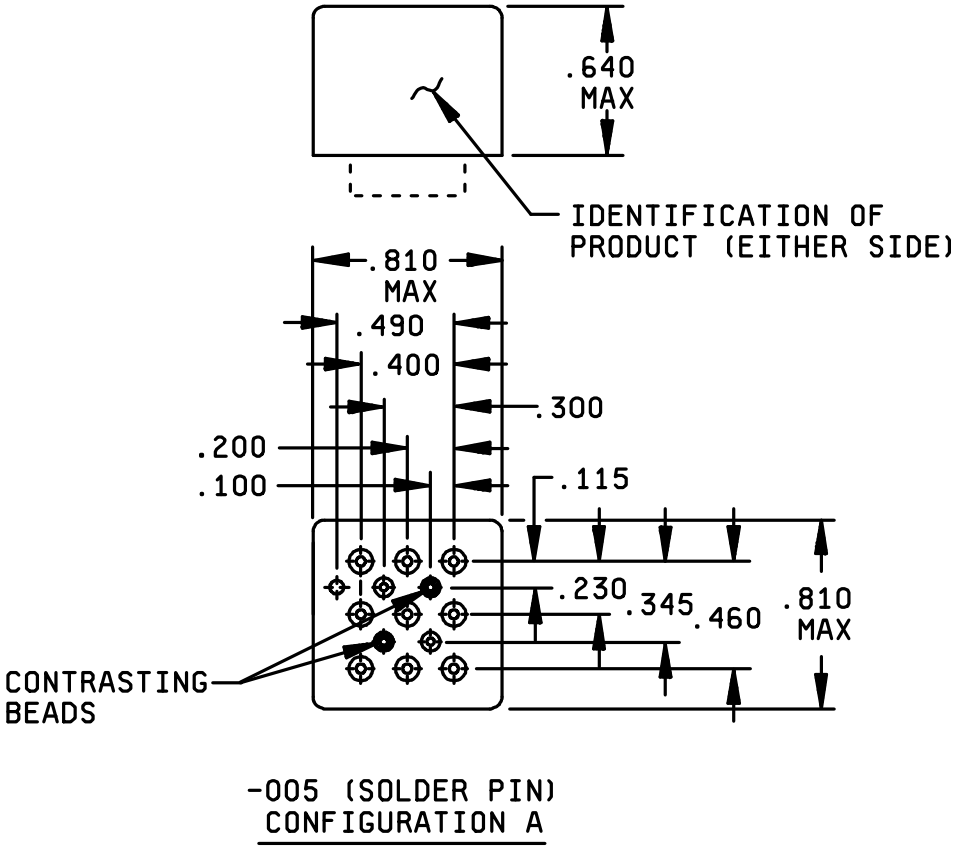
MIL-PRF-6106/40C
10 November 2000
SUPERSEDING
MIL-PRF-6106/40B(USAF)
22 June 1993

PERFORMANCE SPECIFICATION SHEET

RELAY, ELECTROMAGNETIC, TYPE I, MAGNETIC LATCH, PERMANENT MAGNET DRIVE, LOW LEVEL TO 10 AMPERES, 3 PDT, HERMETICALLY SEALED

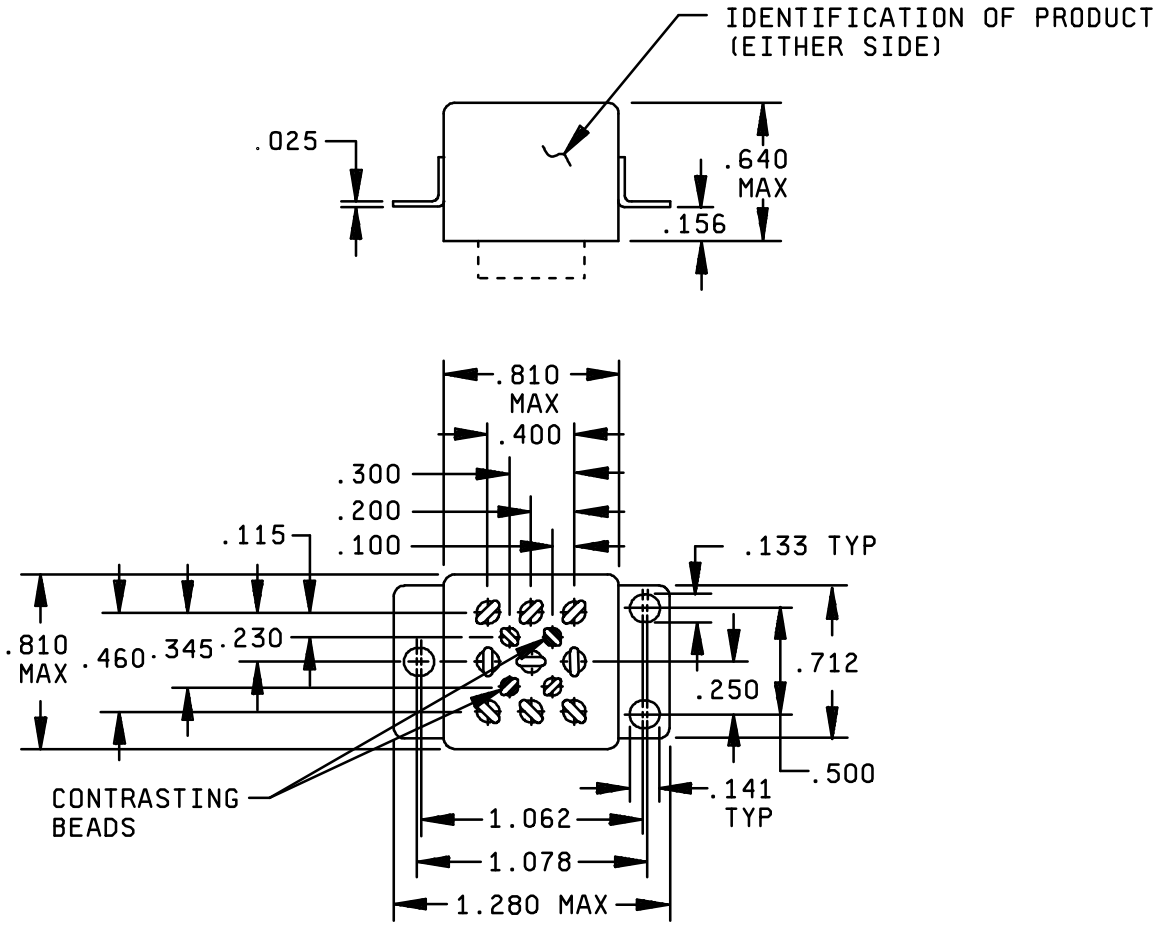
This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the relays described herein shall consist of this specification and the latest issue of MIL-PRF-6106.



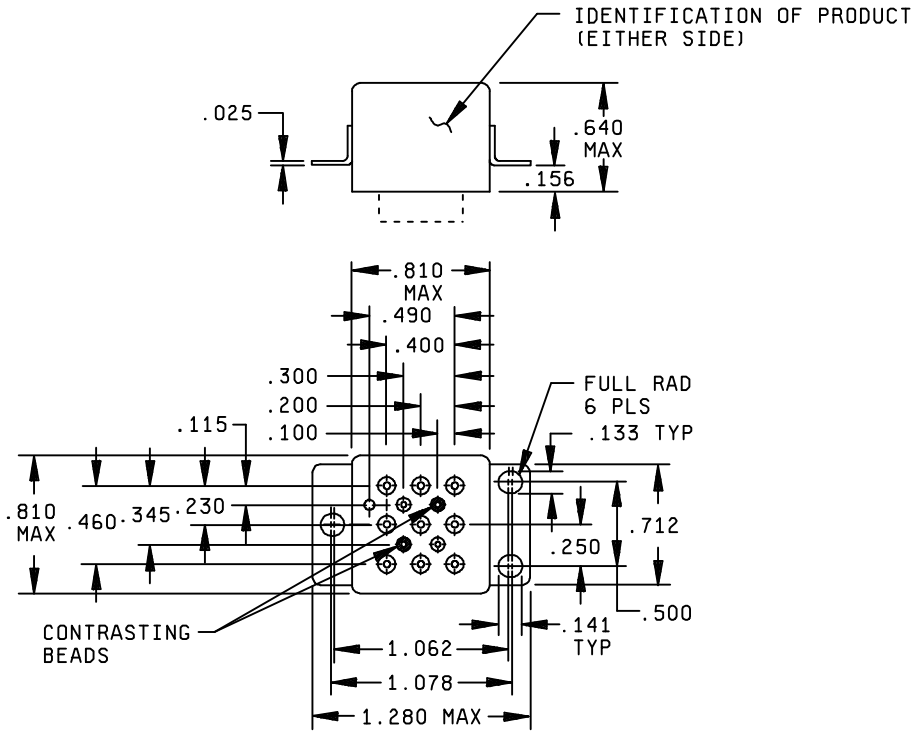
-005 (SOLDER PIN)
CONFIGURATION A

FIGURE 1. Outline drawing.

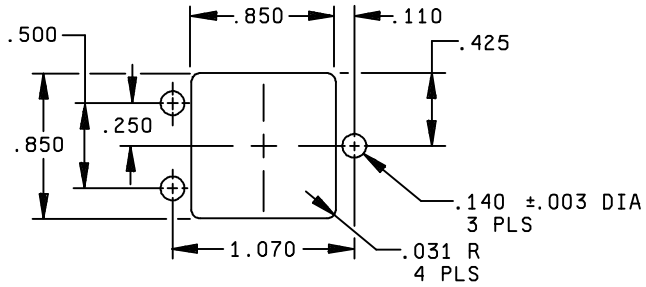


-001 (SOLDER HOOK)
CONFIGURATION B

FIGURE 1. Outline drawing - Continued.

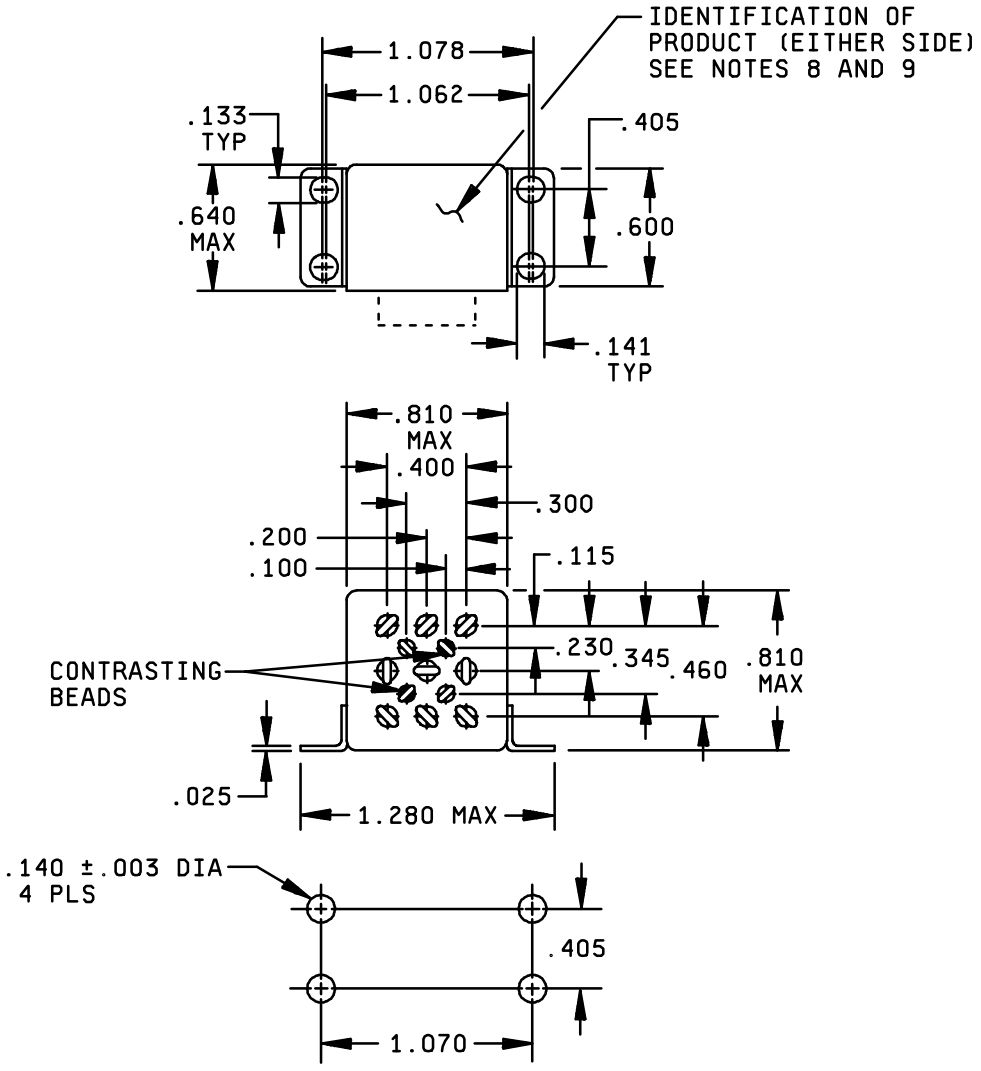


-002 (SOCKET PIN) AND -003 (SOLDER PIN)
CONFIGURATION B (CONT'D)



MOUNTING HOLE LAYOUT (-001, -002, -003)

FIGURE 1. Outline drawing - Continued.



MOUNTING HOLE LAYOUT

-004 AND -006 (SOLDER HOOK)
CONFIGURATION C

FIGURE 1. Outline drawing - Continued.

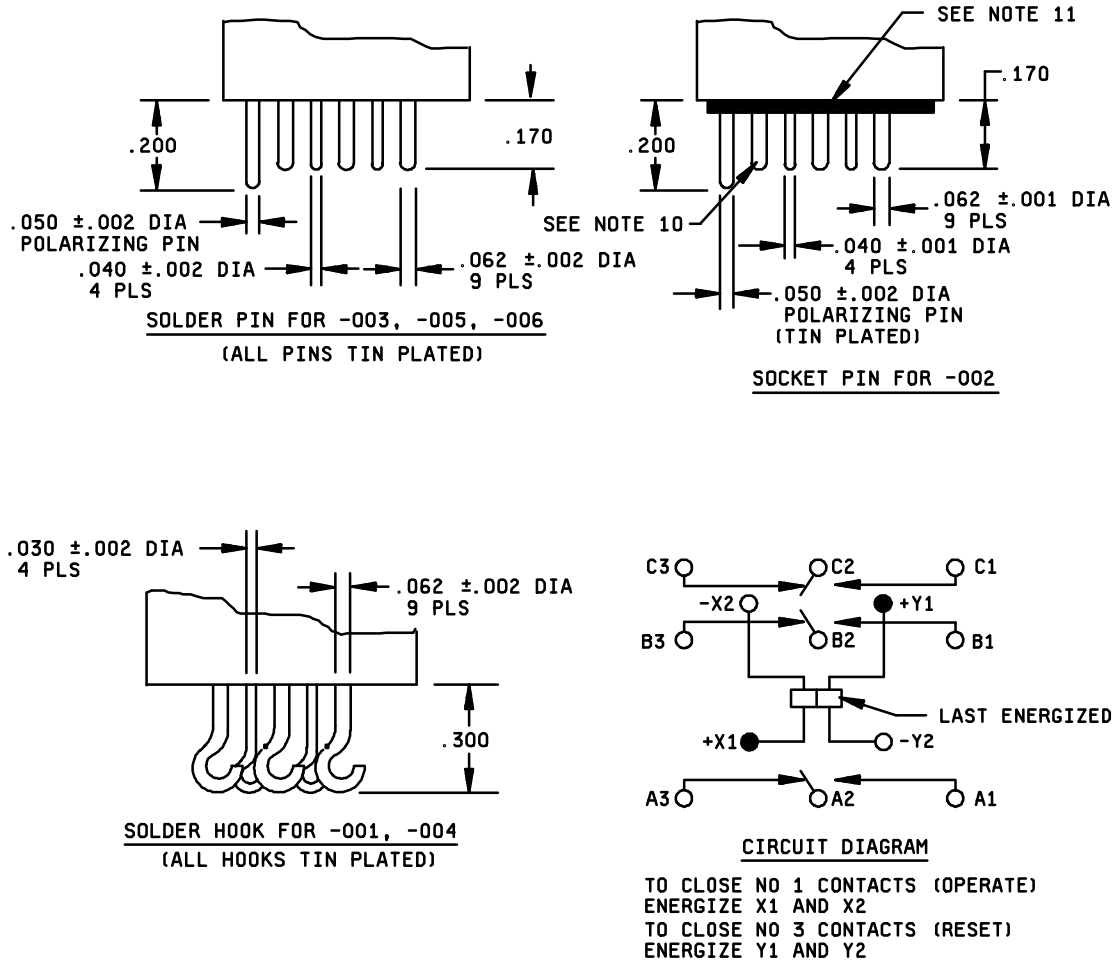


FIGURE 1. Outline drawing - Continued.

Inches	mm	Inches	mm	Inches	mm	Inches	mm
.001	0.03	.062	1.57	.200	5.08	.640	16.26
.002	0.05	.100	2.54	.230	5.84	.712	18.08
.002	0.08	.110	2.79	.250	6.35	.810	20.57
.005	0.13	.115	2.92	.300	7.62	.850	21.59
.025	0.64	.133	3.38	.345	8.76	1.062	26.97
.030	0.76	.140	3.56	.400	10.16	1.070	27.17
.031	0.79	.141	3.58	.425	10.80	1.078	27.38
.040	1.02	.156	3.96	.460	11.68	1.280	32.51
.050	1.27	.170	4.32	.500	12.70		

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is ±.010 (0.25 mm).
4. There shall be affixed to the relay a legible circuit diagram that identifies each terminal location specified.
5. These relays are polarized monostable.
6. this relay shall not operate or be damaged by reverse polarity. Semiconductors shall not be used for this purpose.
7. Permanent magnet drive consists of a permanent magnet with its flux path switched and combined with the electromagnetic flux.
8. Applicable to configuration C only. The circuit diagram, manufacturer's PIN, and the military PIN shall be marked on the near side. The remaining portion of the nameplate data shall be marked on the far side.
9. Applicable to configuration C only. Relays shall be marked with the manufacturer's name or source code and date code. In addition, ER relays shall be marked with the serial number. Marking shall be with the bottom of the print adjacent to the near side.
10. Socket pin terminals shall provide the operational, environmental, and interface characteristics to provide a reliable interconnect to gold-plated contacts. Terminals, except the polarizing pin, shall be gold plated. One system for gold plating that may be used is ASTM B488, type 3, class 1.25 with a nickel underplate of 50 to 150 microinches thick. The gold plating system shall enable the product to meet the performance requirements of this specification and shall be approved by the qualifying activity.
11. Gasket shall provide a reliable seal between the relay and mating socket that will meet the environmental, operational, and interface requirements of the relay with the mating socket. The gasket shall have shore hardness 25 ±5, thickness .050 ±.005. Gasket material according to AMS 3332 has been considered acceptable.
12. Back EMF (trnasient voltage): 42 V dc maximum.
13. JANTX or equivalent screened semiconductors shall be used in ER relays with internal coil suppression. Relays using suppression devices shall continue to operate should the suppression circuit be in a failure mode. Diodes shall have a peak inverse voltage of 600 V dc minimum.

FIGURE 1. Relay, outline drawing - Continued.

REQUIREMENTS

CONTACT DATA

Life: Unless otherwise specified, 50,000 cycles.

Load ratings:

High level (relay case grounded).

Resistive: 10 amperes at 28 V dc, 115 V ac, 400 Hz, 1 phase, 115/200 V ac, 400 Hz, 3 phase.

Inductive: 6 amperes at 28 V dc (life, 10,000 cycles), 8 amperes at 115 V ac, 400 Hz, 1 phase, 115 V ac, 400 Hz, 3 phase (life, 20,000 cycles).

Motor: 4 amperes at 28 V dc, 115 V ac, 400 Hz, 1 phase; and 115/200 V ac, 400 Hz, 3 phase.

Lamp: 2 amperes at 28 V dc and 115 V ac, 400 Hz, 1 phase.

Low level: 10 to 50 μA at 10 to 50 mV dc or peak ac. 1/ 2/ 3/

Intermediate current: Applicable.

Transfer load: Not applicable.

Mechanical life (reduced current): 1.25 amperes at 28 V dc, 115 V ac, 1 phase and 3 phase (life, 200,000 cycles)

Mixed loads. Applicable. 4/

Contact voltage drop or resistance. 1/ 2/ 3/

High level:
Initial; 0.150 volt maximum.
After life; 0.175 volt maximum.

Low level:
Initial; 0.050 ohm maximum.
After life; 0.150 ohm maximum.

Contact bounce: 1.0 millisecond maximum.

Break bounce (normally open contacts only): 0.1 millisecond maximum (applicable to dc suppressed coils only).

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1/ For low level, the following shall apply:
a. During endurance and operational reliability testing, contact load shall be 10 to 50 microamperes, 10 to 50 millivolts open circuit voltage, 100 ohms maximum contact resistance.
b. Static contact resistance shall be performed at 50 mA maximum, 50 mV maximum.

2/ For all ER relays, the alternate low level test of operational reliability shall be used.

3/ For group A contact voltage drop test, high level testing shall be performed first, followed by low level testing. The contacts shall not make or break the high level load.

4/ Relay shall be capable of switching low level while switching any of the other rated loads on adjacent contacts.

Overload current: 30 amperes dc
60 amperes ac

Rupture current: 40 amperes dc.
80 amperes ac.

Time current relay characteristics: Applicable (see table I).

TABLE I. Time current relay characteristics. 1/ 2/

1	20 A	1 hour
2	30 A	20 seconds
3	75 A	2 seconds
4	150 A	.53 second

1/ CAUTION: Compare with time current characteristics of the associated circuit protective device.
2/ All relays shall withstand overload and fault currents. Relays must be able to sustain five applications (make and carry only) of power concurrently on adjacent poles at each of four different current levels in the sequence listed in table I. Separate relays shall be tested at 28 V dc and 115/200 V ac, 400 Hz, 3 phase. Cooling time between successive applications shall be 30 minutes. Tests shall be performed on both normally open and normally closed contacts. There shall be no failures or evidence of welding or sticking and relays shall pass contact voltage drop at the conclusion.

COIL DATA 5/: (See table II).

Operate time: 6 milliseconds maximum with rated coil voltage.

Release time: 6 milliseconds maximum from rated coil voltage.

Duty rating: Continuous.

ELECTRICAL DATA

Insulation resistance, initial; 100 megohms.

After life or environmental tests; 50 megohnms.

5/ CAUTION: Due to possible interaction of relay magnetic fields, the following spacing requirements, as a minimum, shall be considered in dense packaging situations:
a. Row to row assisting fields, .125 inch.
b. Row to row opposing fields, .1875 inch.
c. Side to side alternating fields, .0625.
d. Side to side like fields, .125 inch.
6/ Dielectric may be improved by suitable insulation of terminals and wiring after installation.

Dielectric withstanding voltage (sea level):

	Initial V rms (60 Hz)	After life tests V rms (60 Hz)
Coil to case	500	350
Coil to coil	500	350
All other points	1,250	1,000

Dielectric withstanding voltage (altitude) 6/:

	80,000 feet V rms (60 Hz)	300,000 feet V rms (60 Hz)
Coil to case	250	500
Coil to coil	250	500
All other points	350	500

ENVIRONMENTAL CHARACTERISTICS

Operating temperature range: -70°C to +125°C.

Maximum altitude rating: 300,000 feet.

Acceleration: Applicable (15 g's maximum).

Shock (specified pulse): MIL-STD-202, method 213, test condition C (100 g's), except configurations A and B peak g value shall be 200 g's. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum for open contacts.

Vibration (sinusoidal): Configurations A and B shall be 30 g's, 70 to 3,000 Hz. ConfigurationC shall be 20 g's, 57 to 3,000 Hz. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum for open contacts.

Vibration (random). MIL-STD-202, method 214, for configurations A and B, test condition IG (0.4 g^2/Hz), for configuration C, test condition IE (0.2 g^2/Hz). contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum for open contacts.

PHYSICAL DATA

Strength of terminals and mounting studs: Applicable.

Terminal solderability: Applicable to solder pin and solder hook terminals only.

Dimensions and configurations: See figure 1.

Weight (maximum): 0.068 pound (30.87 grams).

Seal: Hermetic, relays shall be sealed by welding i.e., laser, TIG (tungsten inert gas) or other suitable means as approved by the qualifying activity.

Construction (internal and external). All welded, except that coil magnet wire to coil lead wire shall be soldered.

PART NUMBER: M6106/40- (dash number from table I).

Qualification by similarity: See MIL-PRF-6106.

TABLE II. Dash number and characteristics.

Military PIN M6106 /40-	Coil data									Terminal type	Config-uration	Mating socket
	Coil	Rated			Max		Max pick-up voltage					
		Volts 1/	Freq Hz	Res ±10% at 25°C	Volts 2/	Amp at 25°C	Normal 3/	High test temp	Cont current test			
001	X1, X2 Y1, Y2	28	DC	600	29	.054	18	19.8	22.5	Solder hook	B	N/A
002	X1, X2 Y1, Y2	28	DC	600	29	.054	18	19.8	22.5	Socket pin	B	mil-s-12883/46-002
003	X1, X2 Y1, Y2	28	DC	600	29	.054	18	19.8	22.5	Solder pin	B	
004	X1, X2 Y1, Y2	28	DC	600	29	.054	18	19.8	22.5	Solder hook	C	
005	X1, X2 Y1, Y2	28	DC	600	29	.054	18	19.8	22.5	Solder pin	A	
006	X1, X2 Y1, Y2	28	DC	600	29	.054	18	19.8	22.5	Solder pin	C	

1/ CAUTION: The use of any coil voltage less than the rated voltage will compromise the operation of the relay.
2/ When maximum ambient temperature does not exceed +85°C, the maximum coil voltage shall b3 32 V dc.
3/ Over the temperature range.

Customer:
Air Force - 11
DLA-CC

Preparing activity:
DLA - CC

Review activities:
Air Force - 99

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